

Application 10/733,664

March 3, 2008 amendment in response to the Office Action dated October 2, 2007

REMARKS/ARGUMENTS

I. Status

Claims 1 and 15 were amended by addition of the term "open". Support for the amendment can be found in Applicant's specification for example on page 11, lines 14 – 20 and on page 12, line 28.

Claims 2 was amended to recite an open fused silica extraction capillary having an internal solid phase extraction surface that binds a group of molecules. Support for amended claim 2 can be found in Applicant's specification, for example on page 51, lines 29 – 31.

Claims 7 was amended to depend from claim 2 and recite a multi-protein complex. Support for amended claim 7 can be found in former claim 9.

Claims 30 through 27 were newly added.

Support for claim 30 can be found in Applicant's specification on page 53, lines 22 – 25.

Support for claim 31 can be found in claims 7 through 11.

Support for claim 32 can be found in claim 15.

Support for claim 33 can be found in claims 16.

Support for claim 34 can be found in Table B.

Support for claim 35 can be found in Applicant's specification on page 51, line 29 through page 52, line 7 and in Table B.

Support for claim 36 can be found in claim 15.

Support for claim 37 can be found in claim 16.

The amendments are fully supported by the application as filed and do not introduce new matter. Entry of these amendments is respectfully requested.

II. Election/Restriction

Applicants elect, with traverse, Invention I, claims 1, 2, 7 – 11, 15 and 16 drawn to a capillary tube. According to section 803 of the MPEP, where claims can be examined together

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without undue burden, the Examiner must examine the claims on merits even though they are directed to distinct inventions. Although the Examiner has placed the two inventions in different classes and claims the co-examination would be burdensome, Applicants assert that all claims in the instant application arose from a single inventive concept a proper search of the subject matter of Invention I (device) claims would also identify prior art relating to Invention II (method) claims.

III. Claim Rejections under 35 U.S.C. §103

A. Hibino et al. in view of Haase

On page 4 of the Office action, the Examiner rejected claims 1, 8, 9 and 11 as allegedly unpatentable over Hibino et al. ("Hibino", US 4,690,907) in view of Haase ("Haase", US 5,276,062). Applicants respectfully traverse the rejection on the grounds that the combination of Hibino and Haase do not teach all the elements of the claimed invention.

Claim 1 of the instant invention recites "[a]n open fused silica extraction capillary having an internal solid phase extraction surface". That is, the inner surface of the channel is an extraction surface.¹ The Examiner describes Hibino's capillary as having an inside surface comprised of immobilized antibodies. Applicants respectfully disagree. Hibino teaches capillary tubes containing a solid matrix having an antibody or antigen immobilized thereon (claim 1). The solid matrix is packed in the capillary². Therefore, the antibodies of Hibino's capillary are on a solid matrix packed in the capillary. Hibino does not teach immobilized antibodies on the inside surface of a capillary.

Claim 1 was amended herein to include the word "open" so that claim 1 now recites "an open fused silica extraction capillary". Hibino does not teach an open capillary. Hibino teaches a solid matrix is packed in the capillary.

Haase teaches a novel affinity media containing avidin fixed to a solid support³ and adsorption elution methods for using the media to separate molecules from a fluid mixture⁴. The media is most commonly "used in the form of particulate beads" that can be used in a column format or batch mode⁵. Therefore, all columns taught by Haase are conventional chromatography columns containing a packed bed of media⁶.

¹ Applicant's specification, page 7, lines 19-22.

² Haase, Abstract, column 5, lines 1-6, column 5, lines 14-19, column 6, lines 18-30, column 6, lines 44-55.

³ Haase, column 3, lines 6 - 10.

⁴ Haase, column 3, lines 28 - 34.

⁵ Haase, column 6, lines 56 - 61.

⁶ Haase, Examples, columns 8 - 13.

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The Examiner alleges “[i]t would have been obvious to modify the shape of the capillary disclosed by Hibino et al. such that it is coiled. A coiled capillary would lengthen working surface of the capillary tube without increasing the length of the capillary tube”. In response, Applicants argue that modification of the shape of Hibino’s capillary would not yield the claimed invention because neither Haase nor Hibino teach **open channels having an internal solid phase extraction surface** that binds a biomolecule. Therefore, claim 1 is not obvious over the combination of Hibino and Haase. According to section 2143.03 of the MPEP, “If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious”. Therefore, since claims 8, 9 and 11 depend from claim 1, they are non-obvious. As no prima facie case of obviousness over Hibino in view of Haase has been established, withdrawal of the § 103 rejection is respectfully requested.

In addition, Hibino teaches away from the instant invention. In column 6, lines 12 – 14, Hibino states “It is important that the inner wall of the capillary tube does not adsorb any protein thereon.” In contrast, as recited in claim 8, it is intended that proteins adsorb to the inner surface, or wall of the capillary. Teaching away is indicative of non-obviousness.

B. Hibino in view of Haase and further in view of Pentoney, Jr.

On page 4 of the Office action, the Examiner rejected claims 2 and 7 as allegedly unpatentable over Hibino in view of Haase as applied to claims 1, 8, 9 and 11 in further view of Pentoney (US 5,208,466, “Pentoney”). Pentoney teaches an apparatus and method for aligning an electrophoresis capillary with detection optics. Pentoney employs a polyimide coating to strengthen the capillary wall. Claims 2 and 7 are amended herein, and longer recite a polymer coating or a polyimide coating rendering the rejection moot. The withdrawal of the § 103 rejection is respectfully requested.

C. Hibino in view of Haase and further, in view of Smith et al.

On page 5 of the Office action, the Examiner rejected claim 10 as allegedly unpatentable over Hibino in view of Haase as applied to claims 1, 8, 9 and 11 in further view of Smith (US 4,569,794, “Smith”). Claim 10 depends from claim 1 and is drawn to an extraction surfaced comprised of an immobilized metal ion. Applicants respectfully traverse the rejection.

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Smith teaches a process for separating biologically active polypeptides or proteins using a resin containing immobilized metal ions. All of Smith's separations are performed in packed columns having resins such as Sepharose 6B or Chelex 100.⁷ Therefore, Hibino, Haase and Smith all teach packed columns while the extraction capillaries of the claimed invention are open and have an internal solid phase extraction surface. It follows that it would not be possible for one skilled in the art to combine the teachings of Hibino, Haase and Smith to arrive at the invention of claim 10. In view of the foregoing, the withdrawal of the § 103 rejection is respectfully requested.

D. Hibino in view of Haase and further, in view of Miller et al.

On page 6 of the Office action, the Examiner rejected claims 15 and 16 as allegedly unpatentable over Hibino in view of Haase as applied to claims 1, 8, 9 and 11 in further view of Miller (US 3,807,389, "Miller"). Claim 15 recites the open fused silica extraction capillary of claim one wherein the first end is connected to a pump, the pump being a syringe pump, pressurized container, centrifugal pump or electrokinetic pump. Claim 16 is drawn to a plurality of the extraction capillaries of claim 15. Applicants respectfully traverse the rejection.

Miller teaches a medical instrument for measuring intravascular fluid pressure in vivo. The Examiner states "Miller et al. disclose the use of a syringe to pump fluid through a capillary" and cites column 3, lines 35-40. The Examiner further states "In light of the disclosure of Miller et al., it would have been obvious to substitute the vacuum pump with a syringe pump since syringes are widely available." As Applicants argued above the combination of Hibino and Haase teach only packed columns. In contrast, the claimed invention is drawn to open extraction capillaries. The addition of Miller does not provide open extraction capillaries. Therefore, claim 1 is non-obvious over the combination of Hibino, Haase and Miller. And since claims 15 depends from claim 1, and claim 16 depends from claim 15, claims 15 and 16 are non-obvious over the combination of Hibino, Haase and Miller.

It is worth noting that the passage cited to by the Examiner refers to a hypodermic syringe rather than a syringe pump. A hypodermic syringe is a widely available, manually operated device used for giving injections and drawing blood, while a syringe pump is a power-driven instrument.

⁷ Smith, column 7, lines 1 - 13.

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With regard to claim 16, the Examiner states "[i]t would have been obvious to one of ordinary skill in the art to provide a plurality of the modified Hibino et al. capillary tubes so that multiple assays can be conducted simultaneously." In response, Applicants assert the Examiner's argument is not relevant in light of the fact that the combination of Hibino, Haase and Miller do not teach the claimed invention. In view of the foregoing, the withdrawal of the § 103 rejection is respectfully requested.

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CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

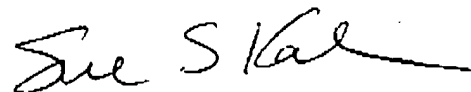
The Commissioner is hereby authorized to charge \$230 for a two-month extension of time to Deposit Account No. 50-2852. In the event that an extension of time is required in addition to that requested in the enclosed petition for an extension of time, the Commissioner is requested to grant a petition for that extension of time which is required to make this response timely and is hereby authorized to charge any fee for such an extension of time or credit any overpayment for an extension of time to Deposit Account No. 50-2852.

If a telephone conference would expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (408)267-7214.

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Respectfully submitted,



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Attachments:

- 1) Transmittal Sheet
- 2) Petition for Extension of Time